

What is claimed is:

1. A cold trap, comprising:
cold trapping surfaces to prevent migration of lubrication molecules that are
5 not deposited onto storage discs during a vapor lubrication process from a vapor
lubrication station to adjacent process and/or transport chambers.
2. The cold trap of claim 1, wherein the cold trapping surfaces prevent
migration of the lubrication molecules to the adjacent process and/or transport
10 chambers during transfer of the storage discs from upstream processes to the vapor
lubrication station and/or during transfer of the storage discs from the vapor
lubrication station to downstream processes.
3. The cold trap of claim 1, wherein the cold trapping surfaces are held under
15 low working pressure by means of high performance vacuum pumps.
4. The cold trap of claim 3, wherein the cold trapping surfaces are cooled using
refrigerants selected from the group consisting of liquid nitrogen, low-temperature
refrigerant, cold water, and cold air.
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5. The cold trap of claim 3, further comprising:
one or more temperature sensors to sense the temperature of the cold trapping
surfaces and to output a signal proportional to the sensed temperature; and
a control circuitry coupled to the temperature sensors to monitor the
25 temperature of the cold trapping surfaces by receiving the signal from the
temperature sensors, and further to automatically shut-off the operation of the vapor
lubrication station to prevent accidental migration of lubrication molecules in case of
a failure in the cold trap.

6. A vapor lubrication station, comprising:
one or more cold traps to prevent migration of lubrication molecules that are
not deposited onto storage discs during a vapor lubrication process from the vapor
5 lubrication station into adjacent process chambers.

7. The vapor lubrication station of claim 6, wherein the adjacent process
chambers comprise:
adjacent process chambers to deposit successive layers onto the storage discs
10 to produce discs, and/or transport chambers used in transporting the storage discs
between the process chambers.

8. The vapor lubrication station of claim 6, wherein the cold traps to
prevent migration of the lubrication molecules during the transporting of storage
15 discs prevent migration of the lubrication molecules to the adjacent process
chambers during transferring of the storage discs from upstream processes to the
vapor lubrication station and/or during transferring of the storage discs from the
vapor lubrication station to downstream processes.

20 9. The vapor lubrication station of claim 8, wherein transferring the storage
discs comprises:
transferring the storage discs using disc-handling systems selected from the
group consisting of transport mechanisms, conveyors, lifters, and one or more
cassettes.

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10. The vapor lubrication station of claim 6, further comprising:

one or more entry/exit ports disposed between the vapor lubrication station and/or the adjacent process chambers, wherein the one or more cold traps are disposed around the one or more entry/exit ports, respectively.

- 5 11. The vapor lubrication station of claim 10, wherein the one or more entry exit ports comprise:

gates and/or valves that open and close to receive and output the discs.

12. The vapor lubrication station of claim 6, wherein the vapor lubrication station
10 is held under low working pressure in the range of about 5×10^{-5} to 5×10^{-9} Torr by means of high performance vacuum pumps.

13. The vapor lubrication station of claim 6, wherein the cold traps comprise:
cold trapping surfaces to prevent migration of lubrication molecules that are
15 not deposited onto the disc into the adjacent process chambers.

14. The vapor lubrication station of claim 13, wherein the cold trapping surfaces
are cooled to have a temperature in the range of about -195°C to 25°C using
refrigerants selected from a group consisting of liquid nitrogen, low-temperature
20 refrigerant, and cold water.

15. The vapor lubrication station of claim 13, further comprising:
one or more temperature sensors to sense the temperature of the cold trapping
surfaces and to output a signal proportional to the sensed temperature; and
25 a control circuitry coupled to the temperature sensors to monitor the
temperature of the cold trapping surfaces by receiving the signal from the
temperature sensors, and further to automatically shut-off the operation of the vapor

lubrication station to prevent accidental migration of lubrication molecules due to a failure in the operation of the cold traps.

16. A method of preventing migration of lubrication molecules into adjacent
5 process chambers from a vapor lubrication station, comprising:
- (a) trapping lubrication molecules that are not deposited onto storage discs during the vapor lubrication process in the vapor lubrication station using one or more cold traps including cold trapping surfaces.
- 10 17. The method of claim 16, wherein trapping the lubrication molecules comprises:
- (a)(1) trapping the lubrication molecules during transfer of the storage discs from upstream processes to the vapor lubrication station and/or further during transfer of the storage discs from the vapor lubrication station to downstream
15 processes.
18. The method of claim 16, further comprising:
- (b) sensing the temperature of the cold trapping surfaces;
- (c) monitoring the sensed temperature; and
20 (c) shutting down the vapor lubrication station to prevent accidental migration of lubrication molecules into the adjacent process chambers based on the outcome of the monitoring.
19. The method of claim 16, wherein cold trapping surfaces are cooled using
25 refrigerants selected from the group consisting of liquid nitrogen, low-temperature refrigerant, cold water, and cold air.
20. A vapor lubrication station, comprising:

means to deposit lubrication molecules onto storage discs; and

means to prevent migration of lubrication molecules that are not deposited onto storage discs during a vapor lubrication process in the vapor lubrication station into adjacent process chambers and/or transport chambers.

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